

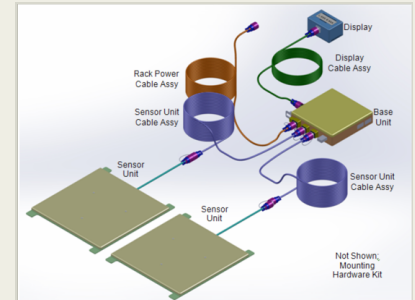
Enhanced Dynamic Load Sensor for ISS (EDLS-ISS), Phase II

Completed Technology Project (2014 - 2016)



Project Introduction

Aurora Flight Sciences and the Massachusetts Institute of Technology (MIT) propose to develop a stand-alone 6-DOF load sensing system that collects biomechanical force and moment data while integrated with the Advanced Resistive Exercise Device (ARED) on the International Space Station by adapting and enhancing previously field-tested systems. Our EDLS-ISS system includes a separate base unit tethered to two low-profile sensors, which can be non-invasively mounted on the surface of the ARED to serve as new footplates. The EDLS-ISS is being developed for two reasons: - Operational. Force plates on the ARED will allow crewmembers to verify loading, and to record forces. This device provides a simple, non-invasive solution that measures foot forces and displays this to the astronaut. - Research. Kinematic experiments on the ARED – for example, characterizing limb segment relative motions during a squat – require corresponding force and moment measurements. Our EDLS-ISS system provides three-axis force and three-axis moment measurements for such experiments. By providing a short-term operational solution and a sustainable long-term research solution, ELDS-ISS is an important tool for the spaceflight community. During Phase I, we improved the design of the existing 6-DOF Microgravity Investigation of Crew Reactions in 0-G (MICRO-G) Adapt sensor module, previously developed by Aurora and MIT. These improvements optimized the sensor for use on the ARED: decreasing the overall height of the sensors and separating the electronics into an off-board "base unit", increasing the footprint size to cover most of the surface of the ARED platform, updating the hard drive and electronics, providing a real-time user-feedback display, and developing ARED mounting options. The anticipated result of our Phase II effort will be three complete EDLS-ISS systems, each of which includes a base unit and two sensor units. Two systems will be flight-qualified.



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

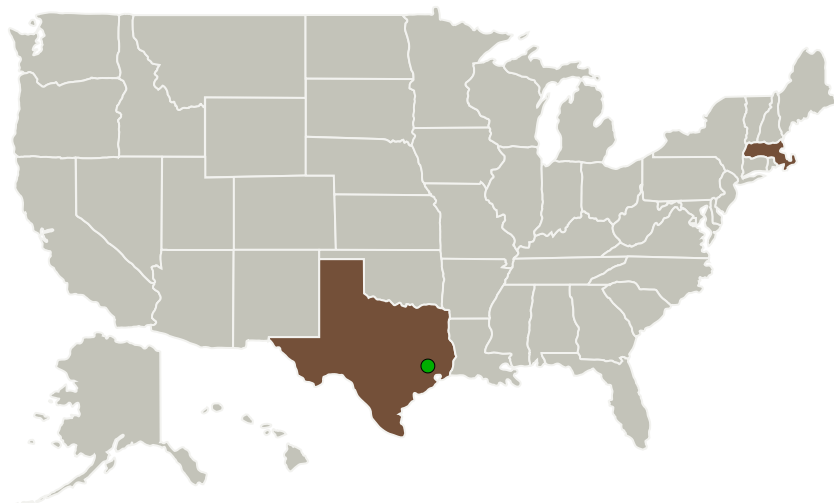
Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Massachusetts	Texas

Project Transitions

**May 2014:** Project Start**September 2016:** Closed out

Closeout Summary: Enhanced Dynamic Load Sensor for ISS (EDLS-ISS), Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/137598>)

Project Management

Program Director:

Jason L Kessler

Program Manager:

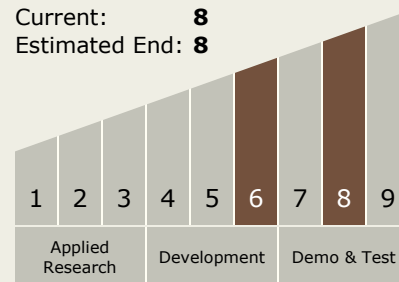
Carlos Torrez

Principal Investigator:

Christopher Krebs

Technology Maturity (TRL)

Start: 6
Current: 8
Estimated End: 8



Technology Areas

Primary:

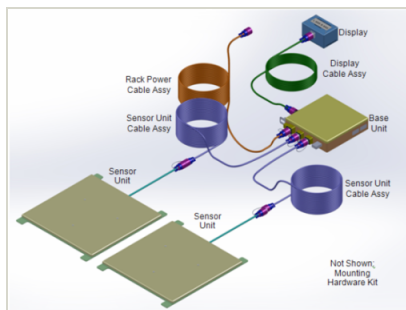
- TX06 Human Health, Life Support, and Habitation Systems
 - TX06.3 Human Health and Performance
 - TX06.3.2 Prevention and Countermeasures

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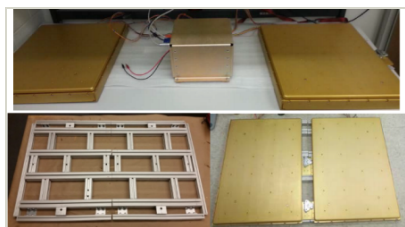


Images



Briefing Chart Image

Enhanced Dynamic Load Sensor for ISS (EDLS-ISS), Phase II
(<https://techport.nasa.gov/image/136713>)



Final Summary Chart Image

Enhanced Dynamic Load Sensor for ISS (EDLS-ISS), Phase II Project Image
(<https://techport.nasa.gov/image/127872>)

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System